In the Claims

Please amend the claims as follows:

1. (Currently Amended) A method of tracking the position of an imaging head of a catheter in three-dimensional space within a human body, the method comprising:

receiving a first image captured by the catheter;

receiving a second image captured by the catheter, wherein the first image comprises a first data location and the second image comprises a second data location corresponding to the first data location;

comparing the first and second images to determine first correlation loss data between the first and second images, wherein determining the first correlation loss data comprises determining a difference in an image property between first image data stored in the first data location and second image data stored in the second data location;

determining a first rate of correlation loss between the first and second image in a direction using the first correlation loss data, wherein determining the first rate of correlation loss comprises determining a rate of change of the first correlation loss data;

determining a first angle of separation between the first and second images using the first rate of correlation loss; and

determining first position data for the second image, relative to the first image, using the ~~first rate of correlation loss~~ the first angle of separation; and

outputting the first position data.

2. (Cancelled)

3. (Previously Presented) The method of claim 1, further comprising:

comparing the first and second images to determine second correlation loss data between the first and second images;

determining second position data for the second image, relative to the first image, using the second correlation loss data; and

outputting the second position data.

4. (Original) The method of claim 3, wherein determining second position data for the second image comprises determining a second angle of separation between the first and second images using the second correlation loss data, and determining second position data for the second image, relative to the first image, using the second angle of separation.

5. (Original) The method of claim 3, wherein the first and second correlation loss data measure correlation loss in different directions.

6. (Original) The method of claim 3, wherein the first image comprises a first plane and the second image comprises a second plane.

7. (Original) The method of claim 6, wherein the first position data comprises a first line in three dimensions in the second plane and the second position data comprises a second line in three dimensions in the second plane, and wherein the first position data and the second position data define a position of the second plane in three dimensions.

8. (Original) The method of claim 1, wherein the first image comprises a first plane and the second image comprises a second plane.

9. (Original) The method of claim 8, wherein the first position data comprises a first line in three dimensions in the second plane.

10. (Cancelled)

11. (Original) The method of claim 10, wherein the image property comprises one or more of density, color, hue, saturation, or reflectivity.

12. (Original) The method of claim 10, wherein determining first correlation loss data further comprises repeating the determination for a plurality of data locations situated along a line in the first image and a corresponding line in the second image.

13. (Original) The method of claim 12, wherein the corresponding line in the second image is a projection onto the second image of the line in the first image.

14. (Currently Amended) A computer program stored in a computer-useable medium, the computer program comprising a sequence of instructions which, when executed by a processor, causes the processor to execute a method of tracking the position of an imaging head of a catheter within a human body, the method comprising:

receiving a first image captured by the catheter;

receiving a second image captured by the catheter, wherein the first image comprises a first data location and the second image comprises a second data location corresponding to the first data location;

comparing the first and second images to determine first correlation loss data between the first and second images, wherein determining the first correlation loss data comprises determining a difference in an image property between first image data stored in the first data location and second image data stored in the second data location;

determining a first rate of correlation loss between the first and second image in a direction using the first correlation loss data, wherein determining the first rate of correlation loss comprises determining a rate of change of the first correlation loss data;

determining a first angle of separation between the first and second images using the first rate of correlation loss; and

determining first position data for the second image, relative to the first image, using the ~~first rate of correlation loss~~ the first angle of separation; and

outputting the first position data.

15. (Cancelled)

16. (Previously Presented) The computer program stored in the computer-useable medium of claim 14, wherein the method further comprises:

comparing the first and second images to determine second correlation loss data between the first and second images;

determining second position data for the second image, relative to the first image, using the second correlation loss data; and

outputting the second position data.

17. (Previously Presented) The computer program stored in the computer-useable medium of claim 16, wherein determining second position data for the second image comprises determining a second angle of separation between the first and second images using the second correlation loss data, and determining second position data for the second image, relative to the first image, using the second angle of separation.

18. (Previously Presented) The computer program stored in the computer-useable medium of claim 16, wherein the first and second correlation loss data measure correlation loss in different directions.

19. (Previously Presented) The computer program stored in the computer-useable medium of claim 16, wherein the first image comprises a first plane and the second image comprises a second plane.

20. (Previously Presented) The computer program stored in the computer-useable medium of claim 19, wherein the first position data comprises a first line in three dimensions in the second plane and the second position data comprises a second line in three dimensions in the second plane, and wherein the first position data and the second position data define a position of the second plane in three dimensions.

21. (Previously Presented) The computer program stored in the computer-useable medium of claim 14, wherein the first image comprises a first plane and the second image comprises a second plane.

22. (Previously Presented) The computer program stored in the computer-useable medium of claim 21, wherein the first position data comprises a first line in three dimensions in the second plane.

23. (Cancelled)

24. (Previously Presented) The computer program stored in the computer-useable medium of claim 23, wherein the image property comprises one or more of density, color, hue, saturation, or reflectivity.

25. (Previously Presented) The computer program stored in the computer-useable medium of claim 23, wherein determining first correlation loss data further comprises repeating the determination for a plurality of data locations situated along a line in the first image and a corresponding line in the second image.

26. (Previously Presented) The computer program stored in the computer-useable medium of claim 25, wherein the corresponding line in the second image is a projection onto the second image of the line in the first image.

27. (Currently Amended) A system for mapping a lumen in a patient, comprising:

an imaging catheter adapted to capture a plurality of images of the lumen;

a computer adapted to receive the captured plurality of images, compute correlation loss data between each of the images and another one of the images by determining a difference in an image property between a first data location in the image and a second data location in the other image, compute rates of correlation loss in at least one direction using the correlation loss data by determining rates of change of the correlation loss data, determine angles of separation between the images using the rates of change of the correlation loss data and create a map of the lumen by determining a position in three dimensions of each of the plurality of images using ~~the rates of correlation loss~~ the angles of separation; and

an output device adapted to output the map of the lumen.

28. (Original) The system of claim 27, wherein the output device comprises a video display.

29. (Original) The system of claim 27, wherein the computer determines the position of one of the plurality of images by comparing the image with a reference image whose position is known.

30. (Original) The system of claim 29, wherein the system is initialized by arbitrarily defining the position of the reference image.

31. (Original) The system of claim 27, wherein the position of the reference image is known based on a prior determination of the position by the computer.

32. (Currently Amended) The ~~method~~ system of claim 31, further comprising approximating the rate of correlation loss using an exponential function.

33. (Currently Amended) The method of claim 1, wherein determining ~~first position data for the second image~~ the rate of change of the correlation loss data comprises:

fitting ~~an exponential~~ a function to the first correlation loss data; and

computing a derivative of the ~~exponential~~ function to determine the rate of change of the first correlation loss data

~~determining an angle of separation between the first and second images using the derivative of the exponential function; and~~

~~determining the first position data for the second image, relative to the first image, using the angle of separation.~~

34. (Currently Amended) The method of claim ~~2~~ 1, wherein the first image comprises a first plane and the second image comprises a second plane, the first plane and the second plane being non-parallel to each other.